

**Amendments to the Claims:**

This listing of claims will replace all prior versions and listings of claims in the application.

**Listing of Claims:**

Claim 1: (Currently Amended) A device, comprising:

- a substrate having a cavity that extends into the substrate, the cavity having an opening on at least one surface of the substrate;
- an anode positioned within the cavity of the substrate;
- a cathode comprising a first insulating layer positioned above the opening of the cavity, wherein the anode receives electrons emitted by the cathode, and wherein the anode produces an electrical current to an external source in response to receiving the electrons;
- a first grid having at least one aperture to allow the passage of electrons therethrough, wherein the first grid is constructed of an electrically conductive material, and wherein the aperture of the first grid is positioned between the cathode and anode;
- a second grid having a plurality of apertures configured for allowing the passage of electrons therethrough, wherein the aperture of the second grid is positioned between the cathode and anode, and wherein the second grid controls the flow of electrons from the cathode to the anode when a control voltage is applied to the second grid;
- a seal for creating a controlled environment in an area surrounding the first grid, the cathode and the anode, wherein the controlled environment allows for electron flow between the cathode, first grid and anode;
- a circuit for heating the cathode, and
- a control circuit for controlling the magnitude of the flow of electrons through the aperture of the first grid, thereby controlling the electrical current produced by the anode.

Claims 2-4: (Canceled)

Claim 5: (Currently Amended) The device of claim 41, wherein the plurality of apertures of the second grid are aligned with the plurality of apertures of the first grid.

Claim 6: (Currently Amended) The device of claim 41, wherein the cathode is attached to the substrate to create a vacuum environment in an area surrounding the first grid, second grid, anode and cathode.

Claim 7: (Currently Amended) The device of claim 1, wherein the cathode comprises an electron emitting coating disposed thereon, the electron emitting coating comprises at least one of a metal tricarbonates, strontium, calcium or barium.

Claims 8-17: (Canceled)

Claim 18: (Currently Amended) A device, comprising:  
a substrate having a cavity that extends into the substrate;  
an anode constructed of an electrically conductive material, wherein the anode is  
positioned in the cavity of the substrate;  
a cathode comprising a first insulating layer positioned over the cavity of the substrate,  
wherein the anode is configured to receive electrons emitted by the cathode, and  
wherein the anode is configured to produce an electrical current to an external  
source in response to receiving the electrons, wherein the cathode contains an  
electron emitting coating disposed thereon, the electron emitting coating  
comprises at least one of a monocarbonate, a bicarbonate, a tricarboxate,  
strontium, calcium or barium;  
a seal for creating a controlled environment in an area surrounding the grid, cathode  
and anode; and  
a circuit configured for heating the cathode.

Claims 19-32: (Canceled)